

## ABSTRACT OF THE DISCLOSURE

A short circuit arc welding system is disclosed. The control scheme uses a current command signal to drive the output current. The command signal is comprised of a long-term current command that sets the long-term current command level and a real-time or short-by-short current command. Arc voltage feedback is used to determine if the desired arc length is present and to adjust the long-term command. The short-by-short current command is derived from real-time arc current feedback and is used to control the burn-off rate by an instantaneous, or short-by-short, adjustment of the current command. A function of the time derivative of arc power, less the time derivative of arc current, is used to detect, in real time, when the short is about to clear. A stop algorithm is employed that monitors the arc on a short-by-short basis. When the process is ending a very low current level is provided to avoid forming a ball. However, if a short is created, (indicated by a drop in arc voltage) after the low current level, a burst of energy is provided to clear of burn off the short. After the short is cleared, very low current is again provided to avoid forming a large ball. This is repeated until the wire stops and the process ends.

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